User Manual for
IC300OSW232

Cscape™ Software

Second Edition,
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Note

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CHAPTER 1: INTRODUCTION

1.1 Purpose

The purpose of Chapter One is to provide a brief introduction to Cscape Software and its use in controllers.

1.2 Prerequisites

A basic level of understanding of Microsoft Windows technology and operation is assumed. The manual assumes that the user is familiar with Windows-95 or Windows-NT.

Users need to know basic mouse operations and how to locate programs and files using Windows file management tools. They also need to know how to use and create shortcuts. and how to select, rename, save, and delete files.

Cscape uses Windows Common Dialogs to provide a consistent Windows "look and feel." They are pre-defined dialogs that perform specific Windows functions.

In Cscape, Windows Common Dialogs “File Open” and “File Save.” are used. Both dialogs look identical except for the title bar at the top of the dialog:

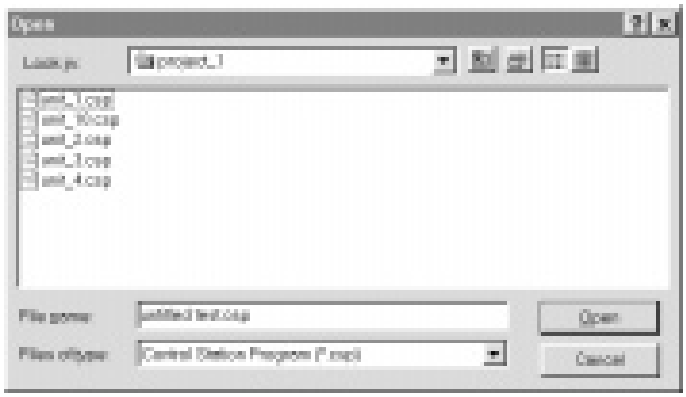


Figure 1.1 - Example of a Dialog Window

A user-level understanding of ladder logic programming coding is also assumed. This manual is not a tutorial for ladder logic programming.

NOTES

CHAPTER 2: CONVENTIONS USED IN THIS MANUAL

2.1 Purpose

The purpose of Chapter Two is to detail the visual and semantic conventions used in the manual.

2.2 Semantic Conventions

GE Fanuc controller products provide many features not normally available in *standard* Programmable Logic Controllers (PLCs). The Operator Control Station (OCS) product line includes features such as built-in displays and network capability.

GE Fanuc differentiates its product from a common PLC by referring to its product as a “controller” or as an "OCS". Both the controller and the OCS have control capabilities. The major difference between a controller and an OCS is that an OCS has display capabilities.

2.3 Typographical Conventions

Whenever possible, graphics are used to depict the actions that need to be taken. In the cases where this is not possible, the following conventions are used:

a. Menu Items, when referenced from text, are printed in Courier Type.

Example: File

b. When a series of menu items must be selected, the items are printed in Courier and are separated by a vertical bar.

Example: File|Open

c. Inputs typed by the user are also printed in Courier.

Example: To select the third item, type <3>

2.4 Mouse Operational Conventions

Cscape is a Windows-based program and depends heavily on the operation of the mouse.

In this manual, the term "left button" is used to describe the "main" button, the one that, when pressed, causes the primary action (usually the selection or activation of an item). The term "right button" describes the "other" button, which may or may not cause a significant action. The "center" button of a three-button mouse (or simultaneously clicking both buttons of a two-button mouse) is not used in Cscape.

Several mouse device drivers have the capability of "switching" mouse buttons to accommodate left-handed or right-handed users. Still, the "left" button causes the primary action, regardless of whether it is on the physical left or right side of the mouse.

The following conventions are used herein to describe mouse actions:

2.4.1 Single Click or Click

Move the mouse cursor into a suitable position, then press the LEFT mouse button ONCE.

2.4.2 Double Click

Move the mouse cursor into a suitable position, then press the LEFT mouse button TWICE in quick succession.

2.4.3 Right-Click

Move the mouse cursor into a suitable position, then press the RIGHT mouse button ONCE.

2.4.4 Select" or "Highlight

Move the mouse cursor over a desired item, and then press the LEFT mouse button ONCE.

2.5 Graphical Conventions

Graphics are used in the manual as much as possible. Whenever possible, a graphical representation is designed to look as much as possible like its real-world counter part.

COMPUTER KEYBOARD KEYS have a rounded, three-dimensional look

WINDOWS BUTTONS have a rectangular, flat look.

Cscape TOOLS have a square, flat look:

CHAPTER 3: PRODUCT OVERVIEW

3.1 Purpose

The purpose of Chapter Three is to provide a brief overview of the Cscape product.

3.2 Product Overview

Cscape stands for "**Control S**tation **A**pplication **P**rogramming **E**nvironment" Using Cscape, the complete control station line can be programmed using a single application programming package.

Included in Cscape are:

- The "drag and drop" Ladder Program Editor.
- Integrated Operator Interface Programming
- Controller Configurator, including I/O Configuration
- Project Navigator, for organization of large projects
- Real-time Debugger

Firmly based in Microsoft Windows technology, Cscape provides an intuitive, familiar interface that is easy to learn and use. Use of the mouse based interface reduces typing to a minimum. Most elements can be specified and placed using the mouse alone.

When a network (CAN, DeviceNet, etc) is provided by the controller products, Cscape can use the network to upload, download, and monitor any GE Fanuc controller residing on the network. Using the Network Pass Through Connection, Cscape can talk to any unit from one position. It is no longer necessary to make a direct physical connection to a unit to be programmed. Cscape can make a logical connection to the unit from any other unit on the network.

Configuration of attached controllers is handled by Cscape. Using Network Pass Through features, any unit can be programmed through a physical connection to any other unit.

Once the ladder program is written, it is automatically checked for syntax errors before it is downloaded. The source code causing syntax errors can be located through a simple click of the mouse.

Ladder source code can be protected from unauthorized viewing or editing by using "OEM Sections". Rungs of ladder code are marked as "OEM Sections", and can be viewed or edited only by personnel with proper security clearance.

Cscape programs can be "self-documenting". That is, it is possible to save the actual source code, comments, and element names to the target unit. Although this takes up valuable memory inside the controller, the complete program – source code, comments, and names – are available to individuals with a sufficient security clearance and the Cscape software. Disk files are not necessary

Physical errors or those errors originating from an outside source can be located by using the Cscape Debugger. This provides a real-time connection to all affected controllers. The user is able to view inputs and outputs and see the subsequent impact of each input and output as they are happening.

Cscape supports the complete GE Fanuc OCS line. Cscape can be manually configured for a specific product, and programs can be written before the hardware is available. Once connected to the network Cscape can automatically configure controllers.

Cscape is capable of supporting multiple ladder program files at one time. The programmer can develop a project which contains all source code files, hardware descriptions, and hardware configuration. Cscape can also debug *all* OCS units simultaneously from a single PC.

CHAPTER 4: SYSTEM REQUIREMENTS

4.1 Purpose

The purpose of Chapter 4 is to describe the hardware and software components necessary to load and install Cscape.

4.2 Requirements

A personal Computer running Microsoft's Windows 95™, Windows 98™ or Windows NT™ Version 4.0 or later:

- 8MB of RAM Memory, minimum.
- Mouse
- 1 free serial port
- 600x800, 256 color video display recommended
- 10 MB of hard disk space

Additional hard disk space will be needed to store any ladder programs that are written.

If the computer uses a serial mouse, a second serial port must be provided for use by Cscape. Serial Port parameters used by Cscape are not user-definable. For reference, the Cscape serial port parameters are set at 9600 baud, 8 data bits, no parity, and 1 stop bit.

NOTES

CHAPTER 5: INSTALLATION

5.1 Purpose

The purpose of Chapter Five is to describe the installation process for Cscape.

5.2 Distribution

Cscape may be provided on two or more floppy diskettes, or on a single CD-ROM. There is no difference in the functionality caused by the distribution method.

In the case of floppy diskettes, the diskettes are clearly labeled **DISK 1**, **DISK 2**, etc. During the installation process you will be asked to insert Disk 2 and any subsequent diskettes, if necessary.

In the case of CD-ROM, there is only one disk provided.

5.3 Installation

The Cscape Distribution disk contains an Installation Wizard.

On floppy diskette 1 or on the CD-ROM locate and run the SETUP.EXE program. Complete instructions are included.

There is only one point where a relatively important decision must be made. You will be asked to choose a directory in which to install Cscape.

The default directory is **C:\Progran Files\Cscape**. This will be acceptable for most installations. Some customers, though, may wish to customize this. The most common "custom" directory is **C:\Cscape**.

In any case, it is important that you remember the Cscape "home" directory path, be it **C:\Progran Files\Cscape**, **C:\Cscape**, or something else.

5.4 Results

A successful Cscape installation will perform the following actions:

The specified Cscape "home" directory will be created if it does not already exist.
A special PROJECTS directory will be created in the Cscape "home" directory, **[home]\PROJECTS**.
The Cscape executable will be installed in the "home" directory.
Cscape Help Files will be installed in the "home" directory.
Cscape will be attached to the Start Menu by placing a group in the **C:Windows\Start Menu \Programs** directory. This group contains shortcuts that can be copied to the desktop or to the Start Menu itself.

5.5 Execution

Cscape is launched by locating and clicking its shortcut:

Click on the Start Button,
Highlight the PROGRAMS menu.
Highlight the CSCAPE menu.
Highlight the Cscape Shortcut.

5.6 Customizing the Installation

There is little that can be customized. The only useful customization is to create a shortcut in a more easily accessible location.

Using standard Windows techniques, locate the **`C:\Windows\Start Menu\Programs\Cscape`** directory.
Right-Click on the Cscape icon.
Select COPY from the popup menu.
Close the directory.
Click the mouse on the Windows Desktop.

This places the Cscape Icon on the desktop for easier use.

CHAPTER 6: GENERAL OVERVIEW – SCREENS, MENUS, AND TOOLS

6.1 Purpose

The purpose of Chapter Six is to describe the screen layout, menus, and tools available to the Cscape user.

6.2 Screen Layout

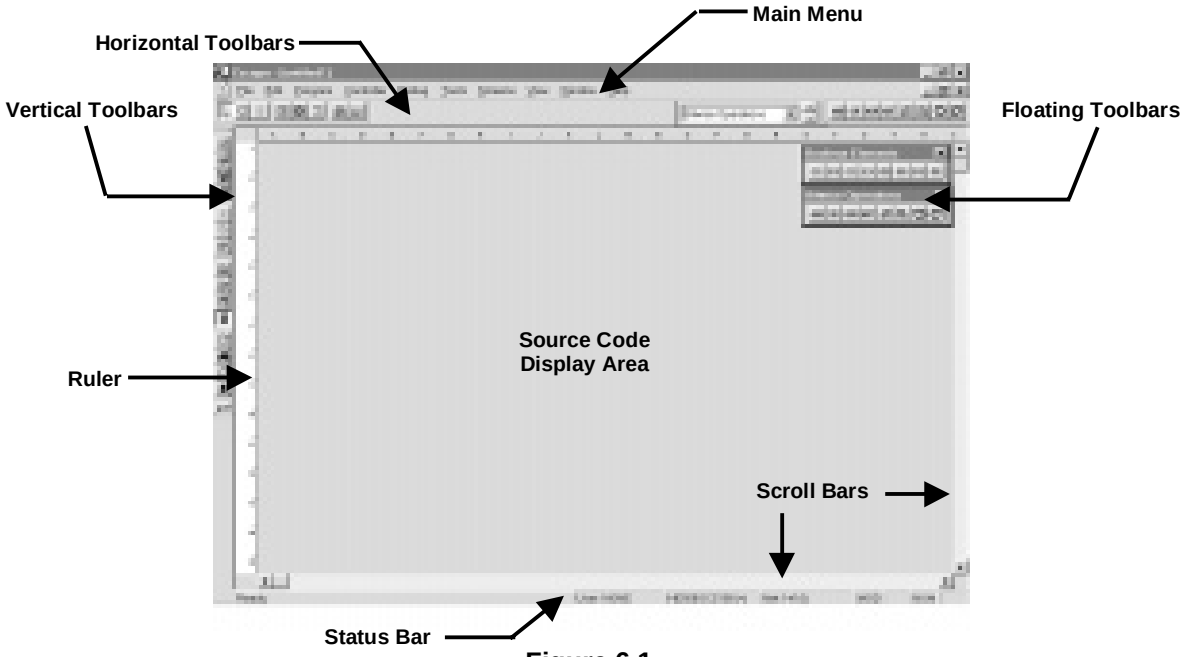


Figure 6.1

Once invoked, the Cscape screen appears as follows:

The important parts of the display are:

Source Code Display Area The ladder program source code is displayed in this area

Main Menu This is the Main Menu which contains the main function grouping from which all sub-menus are derived.

Ruler This contains the Line Number and/or Rung Number of the ladder programs source code.

Scroll Bars Use these windows to view areas of the source code that are not already visible on the screen.

Status Bar This contains the status of the Cscape package.

Toolbars may be placed horizontally, vertically, or "floating":

Horizontal Toolbars Toolbars placed in this area will be placed horizontally across the tops of the display.

Vertical Toolbars Toolbars placed in this area will be placed vertically along the left side of the display.

Floating toolbars Toolbars that are not otherwise placed in the vertical or horizontal areas will appear as child windows, and will "float on top of" any other information or windows displayed by Cscape.

6.3 Menus

Like most Windows programs, Cscape depends heavily on menus. The following is a discussion of the menus and their functions.

6.3.1 Main Menu

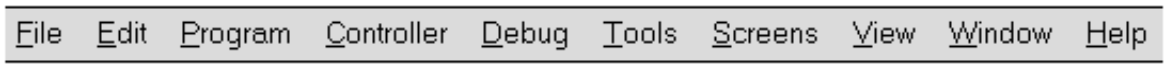


Figure 6.2

The Main Menu is always present at the top of the Cscape window. The following sub-menus are available:

File	Provides file handling capabilities: Open, Close, Print, etc.
Edit	Provides editing capabilities: Cut, Copy, Paste, etc.
Program	Provides functions at the program level: Upload, Download, verify, etc.
Controller	Provides functions at the controller level: Run, Stop, Network ID, etc.
Debug	Provides access to the Debug facilities.
Tools	Provides system-wide utilities such as security and system options
Screens	Provides access to the Text Screen Editor and Remote Terminal Access
View	Provides access to "viewed" features such as comments, grid line, and toolbars.
Window	This is a standard Windows access menu allowing access to a New Window, tiling, etc
Help	Provides access to the on-line help file.

6.3.2 File Menu

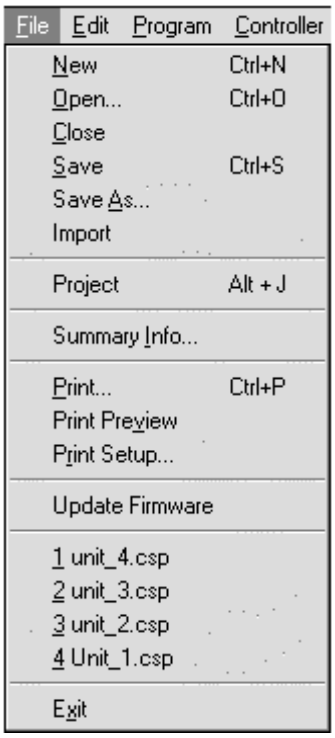


Figure 6.3

New	Opens a NEW ladder program file (CSP)
Open...	Invokes the familiar Windows File Open dialog
Close	Closes the current selected ladder program window.
Save	Saves the currently selected ladder program
Save As...	Invokes the familiar Windows Save As dialog to allow the user to save a file under a new name.
Import	Allows importation of ladder program source files created by the HEPLC Program Editor
Project	Invokes the Create/Open Project dialog.
Summary Info...	Allows the user to add or edit information in the File Summary.
Print	Provides printing features
Print Preview	Provides Print Preview Features
Print Setup...	Provides access to the Printer Setup Dialog Box
Update Firmware	Provides a method to update OCS firmware from within Cscape.
MRU List	Provides a list of the four Most recently Used files.
Exit	Saves and closes all files, then exits the Cscape environment

6.3.3 Edit Menu

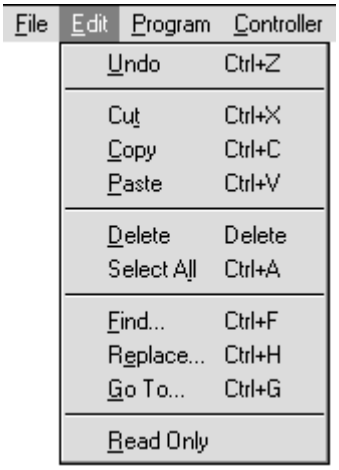


Figure 6.4

Undo	Cancels the last edit.
Cut	Copies the selected elements into an internal buffer for future use, then deletes the selected elements. The deleted elements remain available for future use (paste).
Copy	Copies the selected elements into an internal buffer for future use. The selected elements are not deleted.
Paste	Pastes any information from the internal buffer to the file at the current cursor position.
Delete	Deletes the selected elements. The elements are not saved and can not be re-used.
Select All	Selects all elements in the source file.
Find	Invokes a dialog to allow you to find an element.
Replace	Allows the user to replace a registers reference with a different register reference.
Go To...	Allows the user to go to any LINE NUMBER or RUNG NUMBER.
Read Only	This feature is not implemented in the version of Cscape

6.3.4 Program Menu

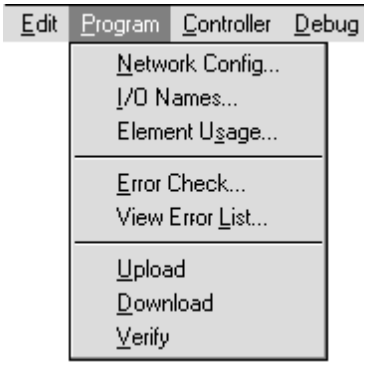


Figure 6.5

Network Inputs...	Invokes a dialog for the assignment of Network (`%IG, %QG`) points.
I/O Names...	Provides a dialog for the naming of I/O points.
Element Usage	generates a "report" about how I/O Elements are used.
Upload	Starts the procedure to upload a program from a controller into Cscape.
Download	Starts the procedure to download a program from Cscape to a controller.
Verify	Starts the procedure to verify a program in a controller with that displayed in Cscape.
Error Check...	Checks the selected source code for syntax errors.
View Error List...	Views the Error List generated by the last Error Check.

6.3.5 Controller Menu

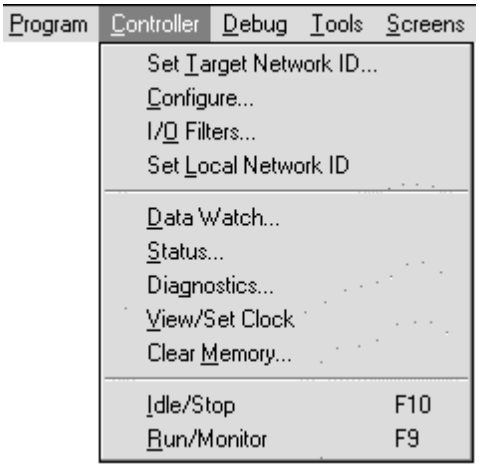


Figure 6.6

Target ID...	Sets the Target ID for the controller associated with the selected ladder program File.
Configure...	Starts the procedure to Select or Configure a Controller Model Type to be associated with the ladder program file.
I/O Filters...	Allows tuning of the Digital Input Filters and the Network Update Time.
Set Network ID	Allows the user to set the Network ID of the Target Unit (if the Target has the ability to change the Network ID by software).
Data Watch...	Starts the Watch Window.
Status...	Takes an instantaneous "snapshot" of the status of the selected controller.
Diagnostics...	Displays the Status of the selected controller.
View/Set Clock	This feature is not available in this version of Cscape
Clear Memory...	Allows the user to clear all of the OCS' memory – program, retentive registers, etc.
Idle	Sets the selected controller to the Idle Mode
Run/Monitor	Sets the selected controller to the Run Mode.

6.3.6 Debug Menu

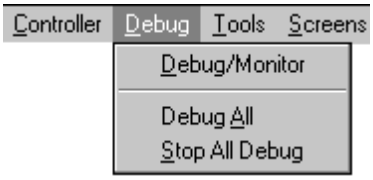


Figure 6.7

Debug	Puts the selected ladder program into the Debug Mode, and creates a real time connection to the associated controller.
Debug All	Places *ALL* ladder programs into the Debug Mode, and creates a real time connection to all associated controllers.
Stop All Debug	Turns off the Debug All mode.

6.3.7 Tools Menu

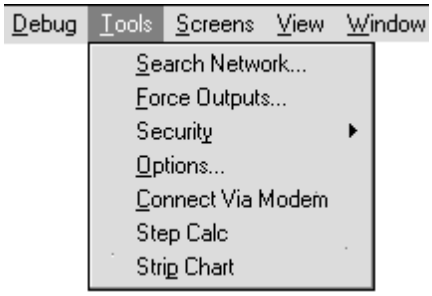


Figure 6.8

Search Network...	Searches the network for all available controllers, then reports their Run Status (RUN/Idle).
Force Outputs...	Allows the user to force outputs to a known state. The controller must be in Idle Mode.
Security...	Starts the Security procedures.
Options...	Starts the procedure to set up system-wide options.
Connect Via Modem	Allows the user to configure a modem in order to program a remote OCS using telephone lines.
Step Calc	Invokes the Stepper Motion Parameter Calculator dialog.
Strip Chart	Invokes a four-element strip chart dialog. Although intended as an aid in PID tuning, this chart can be used with any four INT (16-bit) registers.

6.3.8 Screens Menu

Figure 6.9

View/Edit Screens	Starts the built-in Text Screen Editor.
Edit Text Tables	Start the built-in Text Table Editor.
Remote Text Term	Creates a real-time connection to the associated controller and allows the user to manipulate the controller's front panel under the control of Cscape.

6.3.9 View Menu

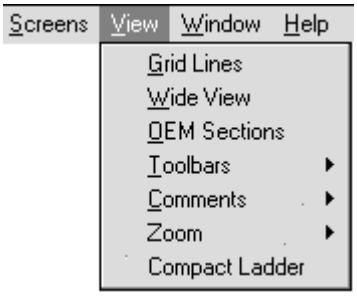


Figure 6.10

Grid Lines	Turns ON or OFF the grid lines used for placement of ladder program elements.
Wide View	Make the element grid position wider so that long element names may be more easily read.
OEM Sections	Allows special "OEM" (proprietary) code sections to be seen *if the proper password is provided.*
Tool Bars	Allows the user to turn ON or OFF those toolbars that have this capability.
Comments	Allows the user to place comments inside the ladder program.
Zoom	Allows the display to be "zoomed" for better viewing of selected areas.
Compact Ladder	Removes all blank rungs and lines from the ladder program

6.3.10 Window Menu

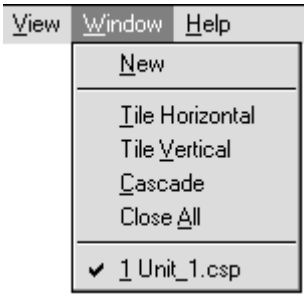


Figure 6.11

NEW	CREATES A NEW, VIEW OF THE CURRENT CODE WINDOW.
Tile Horizontal	Tiles all open windows in a horizontal manner.
Tile Vertical	Tiles all open windows in a vertical manner.
Cascade	Tiles all open window in a cascade manner.
Close All	Closes all open windows.
Open Window List	This is a list of all opened windows.

6.3.11 Help Menu

Figure 6.11

Contents	Goes directly to the Contents Page of the Cscape Help File.
Using Help…	Provides information on how to use the help function.
Technical Support…	Provides information on how to reach Technical Support
About Cscape	Provides version information about Cscape.

6.3.12 Element Handling Popup Menu

Figure 6.12

This menu pops up when the user right-clicks on a ladder program element:

Cut	Places the selected elements into an internal buffer, then removes them from the ladder program. The "cut" elements are available for future use using "paste".
Copy	Places the selected elements into an internal buffer, but does NOT remove them from the ladder program. The "copied" elements are available for future use using "paste".
Paste	Places any elements that are in the internal buffer into the position indicated by the cursor.
Element Properties	Allows the user to set the element properties (i.e., Type, offset, name).
Delete	Deletes the selected elements. The elements are not available for future use.
Edit Screen	Invokes the built-in text Screen Editor.
Where Used	Lists all occurrences of the selected element.
Add to Watch	Adds the selected elements to the Watch Window.

6.3.13 Cscape Navigator Project Menu

Figure 6.13

The menu is available only from the Cscape Navigator.

New	Creates a new project.
Open	Opens an existing project.
Save	Saves the information about this project, but keeps the project open.
Save and Close	Saves the project information, then closes the Navigator Dialog.
Edit Project	Allows user to change the project file (CPJ) and notes for this project.
Add All Open Files	Adds all opened source code files (CSP) to this project.
Add Selected Files	Adds certain selected file to the project.
Open All Files	Opens all source code files (CSP) associated with this project.
Download All Files	Downloads all source code to the associated controllers.

6.3.14 Cscape Navigator Network Menu

Figure 6.14

The menu is available only from the Cscape Navigator.

Add Network	Adds a network to the project configuration.
Edit Network	Edits the name, type, and notes about a specific network.
Open All Files	Opens all files associated with the project.
Download All Files	Downloads all files to their associated controllers.
RUN All Controllers	Places all controllers on this network into the RUN mode.
STOP All Controllers	Places all controllers on this network into the STOP mode.
Sort Controllers	Sorts the controller in numeric order according to Node ID .
Check Controller Status	Reads each controller and indicate whether the controller is in RUN or IDLE mode.

6.3.15 Cscape Navigator Program Menu

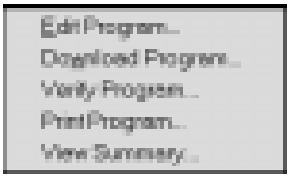


Figure 6.15

Edit Program	Opens the selected program for editing
Download Program	Sends the selected program to the associated controller
Verify Program	Compares the selected program against the program already in the controller
Print Program	Sends the selected program to the printer
View Summary	View the program name, author, and notes for the selected program

6.3.16 Cscape Navigator Controller Menu

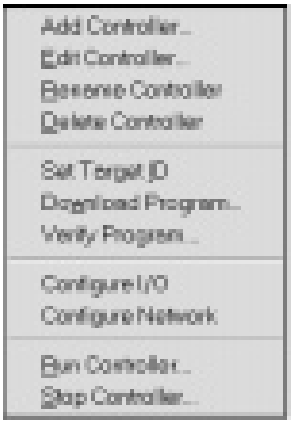


Figure 6.16

Add Controller	Add a new controller to an existing network.
Edit Controller	Allows the selected controller's name, source file, and Target ID to be changed.
Rename Controller	Changes the selected controllers name.
Delete Controller	Remove the selected controller from the project.
Set Target ID	Sets the Node Id associated with this controller.
Download Program	Download the program associated with this controller to the controller.
Verify Program	Compares the selected source code file with that already in the controller.
Configure I/O	Invokes the I/O Configuration dialog for this controller.
Configure Network	Invokes the Network I/O Configuration dialog for this controller.
Run Controller	Places the selected controller into the RUN mode.
Stop Controller	Places the selected controller into the IDLE mode.

6.4 Tool Bars

Next to menus, Tool Bars and Tools are the most common means to access program functions. Tool Bars are also highly configurable. In most cases, the user is able to configure how the Tool Bar looks and how it is displayed.

Cscape Tool Bars are "dockable" in that they may be automatically attached to the top or left side of the display area or they may "float" anywhere on the screen.

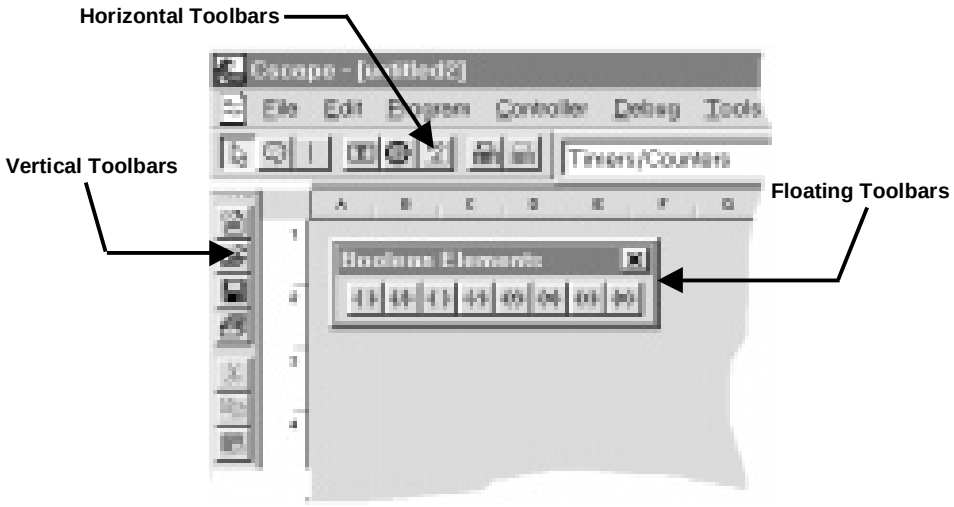


Figure 6.17

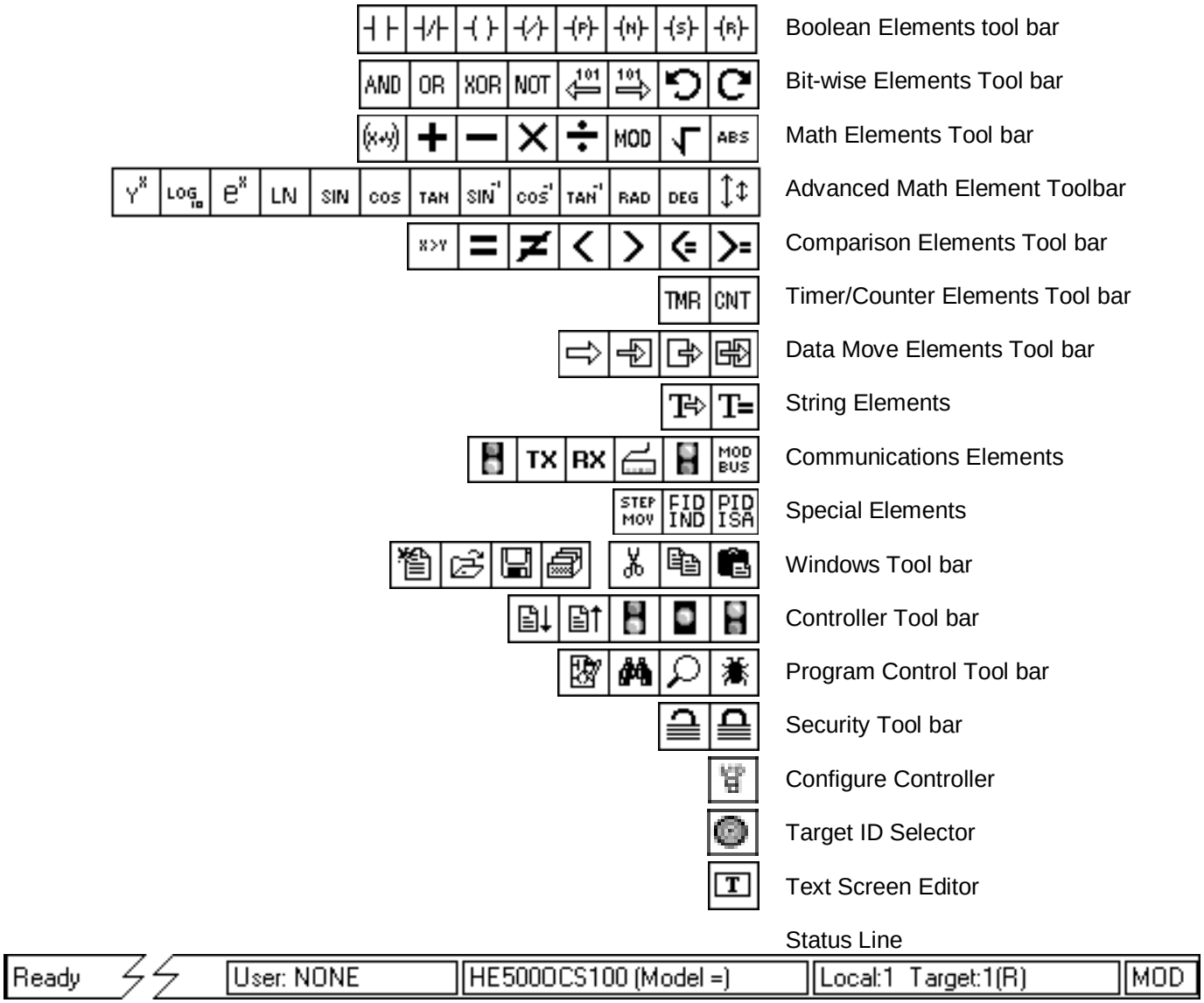
Because Cscape has many toolbars available, a method has been included to allow easy access to all toolbars without cluttering the display. The Toolbar Selection tool appears like the following:

This tool is used to select the Element Toolbars used while creating the Ladder program. The user may select an Element Toolbar by either using the drop-down list, or by using the spinner control. In either case, the selected toolbar appears to the right of the Selection Tool:

Unlike other toolbars, this toolbar is not completely "dockable". It may not be docked to the left side of the screen. If, after selecting one toolbar and floating or docking the result, another toolbar is selected, the docked image will return to it's rightful place beside the Selection Tool.

If it is desired for the Element Toolbars to be fully dockable, select from the `View|Toolbars` menu.

Several Tool bars are available:



6.4.1 WINDOWS Tool bar

New Opens a new CSP file

Open Opens an existing CSP file

Save Save the currently selected CSP file

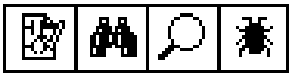
Project Opens or creates a CPJ file

Cut Deletes the currently selected element

Copy Copies the currently selected element

Paste Pastes any elements from the internal buffer into the currently selected CSP file.

6.4.2 Program Control Tool bar



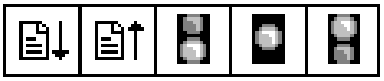
Error Checking Check the currently selected program for syntax errors

Find Specify and find an element in the CSP file

Data Watch Opens a Data Watch window

Debug Enter the Debug Mode

6.4.3 Controller Tool Bar



Download Download the currently selected CSP file to the controller.

Upload Upload the file from the controller into the currently selected CSP file.

Set Controller to RUN mode Set the selected controller to RUN mode

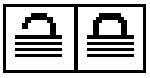
Set Controller to DO I/O Mode Set the selected controller to the DO I/o mode

Set Controller to IDLE mode Set the selected controller to IDLE mode

6.4.4 Target Node ID Tool

Selects the Node ID of the target unit in a Pass Through Connection.

6.4.5 Security Tool Bar



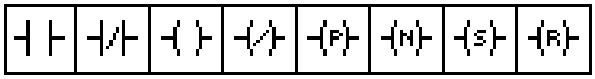
Log In Log in to System Security as a new user

Log Out Log out of System Security

6.4.6 Text Screen Editor Tool

Invokes the Text Screen Editor.

6.4.7 Boolean Elements



Normally Open Contact

Normally Closed Contact

Normally Open Coil

Normally Closed Coil

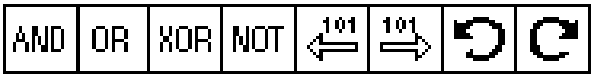
Positive Transition Coil

Negative Transition Coil

Set Coil

Reset Coil

6.4.8 Bit-wise (logical) Elements



Logical AND

Logical OR

Logical Exclusive OR

Logical NOT

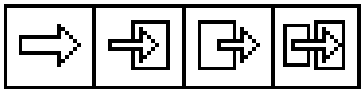
Logical Shift Left

Logical Shift Right

Logical Rotate Left

Logical Rotate Right

6.4.9 Data Move Elements



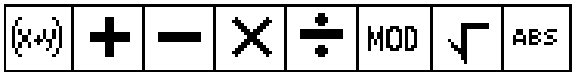
Move Single Register

Fill Block

Move Block of Registers

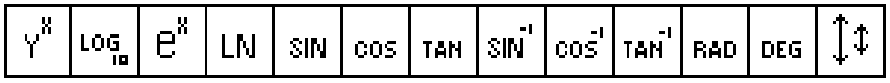
Relative Block Move

6.4.10 Math Elements



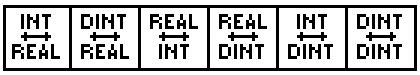
(x+y)	**Equation**	÷	**Divide**
+	**Plus (add)**	MOD	**Modulo**
−	**Minus (subtract)**	√	**Square Root**
×	**Times (multiply)**	ABS	**Absolute Value**

6.4.11 Advanced Math Elements



Y^X	**Exponentiate**	TAN	**Tangent**
LOG_{10}	**Log**	SIN^{-1}	**ArcSine**
e^X	**Exponent**	COS^{-1}	**ArcCosine**
LN	**Natural Log**	TAN^{-1}	**ArcTangent**
SIN	**Sine**	RAD	**Radians**
COS	**Cosine**	DEG	**Degrees**
		↕	**Scale**

6.4.12 Conversion Elements



Integer to Real

Real to Double Integer

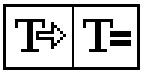
Double Integer to Real

Integer to Double Integer

Real to Integer

Double Integer to Integer

6.4.13 String Manipulation Elements



String Move

String Compare

6.4.14 Comm Port Functions

Open Comm Port

Transmit to Comm Port

Close Com Port

Modem Control

Receive from Comm Port

ModBus Comm Port

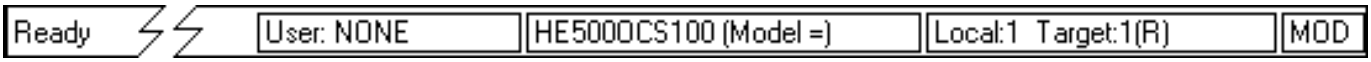
6.4.15 Special Functions

Stepper Move

Independent PID

ISA PID

6.4.16 Status Bar



6.5 Hot Keys

Key	Tool	Functions
<F1>		Context Sensitive Help
<F2>		Select Normally Open (N/O) Contact
<F3>		Select Normally Closed (N/C) Contact
<F4>		Select Branch Element
<F5>		Select Comment Element
<F9>		Select Normally Open (N/O) Coil
<ESC>		Select Tool
<CTRL><N>		Open New File
<CTRL><O>		Open Existing File
<CTRL><S>		Save File
<CTRL><J>		Open Project
<CTRL><P>		Print
<CTRL><X>		Cut Selected Elements
<CTRL><C>		Copy Selected Elements
<CTRL><V>		Paste Selected Elements
<CTRL><Z>		Undo last edit
<CTRL><A>		Select All Elements
<CTRL><F>		Find a Register
<CTRL><H>		Replace a Register
<CTRL><G>		Goto Rung or Line

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